Fairness Criteria Exercises

Please spend as much time as needed to work through these problems before looking at the answers (at the end).

PART I

1. Suppose this preference schedule gives the results of an election among 3 candidates, A, B, and C.

27	**24**	**2**
A	B	C
C	C	B
B	A	A

a. Who wins using the Plurality method?
b. Does any candidate get a majority of the first place votes? If so, which one?
c. Who wins using Pairwise Comparisons?
d. Does any candidate beat every other candidate one-on-one? If so, which one?
e. Who wins using the Borda Count method?
f. Suppose candidate B drops out but the winner is still chosen using the Borda Count method.Is the winner the same as in 'e' above? If not, which candidate does win?

2. Suppose this preference schedule gives the results of an election among 3 candidates, A, B, and C.

20	**19**	**5**
A	B	C
B	C	B
C	A	A

a. Who wins using Pairwise Comparisons?
b. Does any candidate beat every other candidate one-on-one? If so, which one?
c. Who wins using the Plurality method?
d. Suppose candidate C drops out but the winner is still chosen using the Plurality method.
Is the winner the same as in 'c' above? If not, which candidate does win?
e. Who wins using the Plurality with Elimination method? (Candidate C is

back in now.)
f. Now suppose candidate A drops out but the winner is still chosen using the Plurality with Elimination method. Is the winner the same as in 'e' above? If not, which candidate does win?

3. Suppose this preference schedule gives the results of an election among 4 candidates, A, B, C, and D.

14	**4**	**10**	**1**	**8**
A	B	C	C	D
B	D	B	D	C
C	C	D	B	B
D	A	A	A	A

a. Who wins using the Plurality with Elimination method?
b. Who wins using Pairwise Comparisons?
c. Does any candidate beat every other candidate one-on-one? If so, which one?

4. Suppose this preference schedule gives the results of an election among 3 candidates: A, B, and C.

7	**8**	**10**	**4**
A	B	C	A
B	C	A	C
C	A	B	B

a. Who wins using Plurality with Elimination?
b. Suppose the election is invalid for some reason and everyone must revote. As it happens, everyone votes exactly as before except the 4 voters in the last column above. These 4 voters who originally voted A,C,B decide to switch the order of their votes for A & C so that their new preference ballots are C,A,B. Who wins this new election using Plurality with Elimination?

5. Suppose this preference schedule gives the results of an election among 3 candidates.

20	19	5
A	B	C
B	C	B
C	A	A

a. Who wins using the Plurality with Elimination method?
b. Suppose candidate A drops out but the winner is still chosen using Plurality with Elimination. Is the winner the same as in 'a' above? If not, which candidate does win?

6. Suppose this preference schedule gives the results of an election among 5 candidates: A, B, C, D, and E.

3	3	1	1	3	3	1	1
B	A	C	C	B	A	B	E
A	C	B	E	A	D	A	D
C	D	A	B	D	E	E	A
D	E	D	D	E	C	C	C
E	B	E	A	C	B	D	B

a. Who wins using Pairwise Comparisons?
b. Suppose candidate C drops out but the winner is still chosen using Pairwise Comparisons? Is the winner the same as in 'a' above. If not, which candidate does win?

PART II: Carefully EXPLAIN each of the answers you give below.
7. One exercise from PART I illustrates a violation of the Majority Criterion. Which one & why?
8. Three exercises from PART I illustrate a violation of the Condorcet Criterion. Which ones & why?
9. One exercise from PART I illustrates a violation of the Monotonicity Criterion. Which one & why?
10. Three exercises from PART I illustrate a violation of the Irrelevant Alternatives Criterion. Which & why?
Answers

Back to *Fairness Criteria Applied to Voting Methods*